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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/089,987

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Lawrence O'Gorman

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EXAMINER

CARTER, AARON W

ART UNIT

PAPER NUMBER

2624

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
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3 MONTHS

03/28/2007

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

**Office Action Summary**

Application No.

10/089,987

Applicant(s)

O'GORMAN ET AL.

Examiner

Aaron W. Carter

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 02 June 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-35 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 7-13 and 20-27 is/are allowed.
- 6) ☒ Claim(s) 1,4,5,14,17,18 and 28-35 is/are rejected.
- 7) ☒ Claim(s) 2,3,6,15,16 and 19 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 June 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

**DETAILED ACTION**

1. This action is responsive to papers filed on 6/2/06.

***Examiner Note***

2. Please disregard the Abandonment notice sent out on 9/6/06, the application has been revived in accordance with the petition decision filed on 6/30/06.

***Response to Amendment***

3. In response to applicant's amendment received on 6/2/06, all requested changes to the specification and claims have been entered.

***Response to Arguments***

4. Applicant presented no arguments for independent claims 1 and 14, see Remarks, pages 13-21, filed 6/2/06. Therefore the rejection of these claims stands.

5. Applicant's arguments, see Remarks, pages 13-15, filed 6/2/06, with respect to claims 2, 3, 15 and 16 have been fully considered and are persuasive. The rejection of claims 2, 3, 15 and 16 has been withdrawn.

6. Applicant's arguments filed 6/2/06, with respect to claims 4, 5, 17 and 18 have been fully considered but they are not persuasive.

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Applicants argue that the prior art of Asai does not teach or fairly suggest the limitation of “causing the system to determine an ON-pixel value based upon a first electrical representation”.

The examiner disagrees. The prior art of Asai discloses a pixel density technique causing the system to determine an ON-pixel value based upon a first electrical representation in Fig. 18, wherein element S6 and S7 measures and stores a number of black elements in the first fingerprint image which, in the broadest reasonable interpretation of the claim, corresponds to the ON-pixel value.

7. Applicant’s arguments, see Remarks, pages 17 and 18, filed 6/2/06, with respect to claims 6 and 19 have been fully considered and are persuasive. The rejection of claims 6 and 19 has been withdrawn.

8. Applicant’s arguments filed 6/2/07, with respect to claims 28-34 have been fully considered but they are not persuasive.

Applicants argue that the prior art of Fujii does not teach or fairly suggest the limitations of “determining whether the minutia type information matches a minutia type of a matching minutia from an enrolled object; calculating a ratio of mismatched minutia types to matching minutia; and rejecting the fingerprint signal as a spoof when the ratio of mismatched minutia types to matching minutia exceeds a threshold mismatch value”.

The Examiner disagrees. Using the broadest reasonable interpretation of the claims, the prior art of Fujii discloses determining whether the minutia type information matches a minutia

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type of a matching minutia from an enrolled object (Fig. 15, element S38, wherein the number of matching features between an input fingerprint and a registered or enrolled fingerprint is determined); calculating a ratio of mismatched minutia types to matching minutia (Fig. 15, elements S38 and S39, wherein the match ratio described inherently represents a ratio of matching features and mismatching features); and rejecting the fingerprint signal as a spoof when the ratio of mismatched minutia types to matching minutia exceeds a threshold mismatch value (Fig. 15, element S39, wherein the ratio is compared to a threshold to determine if the fingerprint is a spoof or that of the registered human).

### *Claim Objections*

9. Claims 20-22 are objected to because of the following informalities:

As to claims 20 and 21, the word “analysing” is used in line 7 and the word is spelled “analyzing” in line 10. Please change for consistency.

As to claim 21, the word “representatios”, in line 17, is spelled incorrectly. Should be spelled “representations”.

As to claim 22, the word “ration”, in line 2, is spelled incorrectly. Should be spelled “ratio”.

Appropriate correction is required.

***Claim Rejections - 35 USC § 102***

10. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

11. Claims 1 and 14 are rejected under 35 U.S.C. 102(b) as being anticipated by USPN 4,827,527 to Morita et al. (“Morita”).

As to claim 1, Morita a biometric sensing system comprising:

An image capture device configured to capture images of an applied finger over a predetermined period of time and create a plurality of electrical representations of the applied finger (Fig. 17, 18 and column 12, lines 27-33, wherein a fingerprint image is taken and then a predetermined amount of time passes and another image is taken);

A spoof detection module configured to analyze the plurality of electrical representations for relative temporal anomalies of intensity (fig. 18), or relative temporal anomalies of density, as measured between the plurality of electrical representations, indicative of a living applied

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finger (column 11, lines 21-31 and column 12, lines 27-39 wherein if a sufficient change in grey level intensity occurs between successive images then the finger is determined to be that of a living human); and

A minutia matching module for finding matches between the electrical representation of the applied finger (Fig. 18, element Sd5).

12. Claims 1, 4, 5, 14, 17 and 18 are rejected under 35 U.S.C. 102(b) as being USPN 4,872,203 by Asai et al. ("Asai").

As to claim 1, Asai a biometric sensing system comprising:

An image capture device configured to capture images of an applied finger over a predetermined period of time and create a plurality of electrical representations of the applied finger (Fig. 18, wherein a fingerprint image is taken and then a predetermined amount of time passes and another image is taken);

A spoof detection module configured to analyze the plurality of electrical representations for relative temporal anomalies of intensity, or relative temporal anomalies of density (fig. 18), as measured between the plurality of electrical representations, indicative of a living applied finger (Fig. 18 and column 9, lines 9-49, wherein a first finger image is taken and the number of black pixels is counted, a predetermined amount of time is waited, a second image of the finger is taken and the number of black pixels is counted again, due to sweating by the individual the black pixels will become more dense with time and therefore increase in number of black pixels between successive images); and

A minutia matching module for finding matches between the electrical representation of the applied finger (column 9, lines 50-52).

As to claim 4, Asai discloses the biometric sensing system of claim 1, wherein the spoof detection module is configured to employ a pixel density technique to detect and classify the anomalies, the pixel density technique causing the system to determine an ON-pixel value based upon a first electrical representation, determine pixel count for each electrical representation in the plurality of electrical representation, wherein the counted pixels exceed the ON-pixel value, and calculate a delta pixel count over the plurality of electrical representations (Fig. 18 and column 9, lines 9-49, wherein a first finger image is taken and the number of black pixels is counted, which corresponds to the ON-pixel value, a predetermined amount of time is waited, a second image of the finger is taken and the number of black pixels is counted again, due to sweating by the individual the black pixels will become more dense with time and therefore increase in number of black pixels between successive images).

As to claim 5, Asai discloses the biometric sensing system of claim 4, wherein the pixel density technique is further configured to cause the system to accept the applied finger as a living finger when the delta pixel count increases monotonically over the plurality of electrical representations (Fig. 18, element S10).

As to claim 14, please refer to the rejection of claim 1 above.

As to claim 17, please refer to the rejection of claim 4 above.



As to claim 18, please refer to the rejection of claim 5 above.

13. Claims 28-33 are rejected under 35 U.S.C. 102(e) as being anticipated by USPN 6,233,348 to Fujii et al. ("Fujii").

As to claim 28, Fujii a biometric sensing system comprising:

An image capture device configured to capture images of an applied object and create a plurality of electrical representations of the applied object (Fig. 15, S30 and column 17, lines 60-61, wherein the fingerprint sensor corresponds to the image capture device );

A spoof detection module to extract minutia type information from a first electrical representation (Fig. 15, S33, wherein feature points correspond to minutia), compare minutia type information with information corresponding to an enrolled object (Fig. 15, element S38, wherein the number of matching features between an input fingerprint and a registered or enrolled fingerprint is determined), calculate a ratio of mismatched minutia type information to matching minutia information (Fig. 15, elements S38 and S39, wherein the match ratio described inherently represents a ratio of matching features and mismatching features), and reject the applied object as an inverted spoof when the ratio exceeds a threshold type mismatch ratio (Fig. 15, element S39, wherein the ratio is compared to a threshold to determine if the fingerprint is a spoof or that of the registered human).

As to claim 29, Fujii discloses the biometric sensing system of claim 28, further comprising a minutia matching module configured to compare minutiae extracted from the

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electrical representation of the applied object with minutiae of an enrolled object (Fig. 15, S33 and S38).

As to claim 30, Fujii discloses the biometric sensing system of claim 29, wherein the image capture device is a fingerprint sensor (Fig. 15, S30 and column 17, lines 60-61).

As to claim 31, please refer to the rejection made for claim 28 above.

As to claim 32, Fujii discloses the method of claim 31, further comprising:

Capturing the plurality of images of the applied object with a fingerprint sensor (Fig. 15, S30 and column 17, lines 60-61); and

Converting the plurality of images into the one or more electrical representations of the applied object (Fig. 15, S32).

As to claim 33, please refer to the rejection made for claim 29 above.

### ***Claim Rejections - 35 USC § 103***

14. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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15. Claims 34 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fujii in view of USPN 4,353,056 to Tsikos.

As to claim 34, Fujii discloses the method of claim 31, further comprising:

Capturing the plurality of images of the applied object with a fingerprint sensor (Fig. 15, S30 and column 17, lines 60-61); and

Converting the plurality of images into the one or more electrical representations of the applied object (Fig. 15, S31).

Fujii does not disclose expressly that the sensor is a capacitive sensor.

Tsikos discloses a capacitive fingerprint sensor (Title).

Fujii & Tsikos are combinable because they are from the same art of image processing and more specifically fingerprint scanning and authentication.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use a capacitive fingerprint sensor in the process of obtaining a fingerprint sample as disclosed by Fujii.

The suggestion/motivation for doing so would have been to provide a fingerprint sensor of simple structure and works fast (column 1, lines 43-59).

Therefore, it would have been obvious to combine Fujii with Tsikos to obtain the invention as specified in claim 34.

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As to claim 35, the combination of Fujii and Tsikos discloses the method of claim 34, further comprising matching minutiae extracted from at the one or more electrical representations with minutiae from an enrolled object (Fig. 15, S33 and S38).

***Allowable Subject Matter***

16. Claims 7-13 and 20-27 are allowed.

The following is an examiner's statement of reasons for allowance:

17. As to claim 7, none of the prior art teach or fairly suggest the limitation of "accept the applied finger as a living finger when the measured pixel intensity variations are roughly sinusoidal", in combination with the other limitations of the claim. The prior art of Morita, already of record, discloses an image capture device, a spoof detection module and a minutia matching module, wherein the spoof detection module discloses a ridge uniformity technique (column 10, lines 29-46), but does not teach or fairly suggest the limitation of accepting the applied finger as a living finger when the measured pixel intensity variations are roughly sinusoidal, as disclosed in the limitations of claim 7.

18. As to claim 8, none of the prior art teach or fairly suggest the limitations of "locate a first water droplet positioned within an electrical representation" and "accept the applied finger as a living finger when the size of the like-positioned water droplet is larger than the size of the first water droplet", in combination with the other limitations of the claim. The prior art of Morita,

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already of record, discloses an image capture device, a spoof detection module and a minutia matching module, wherein the spoof detection module discloses a water droplet differential technique (column 10, lines 29-46), but does not teach or fairly suggest the limitation of locating a first water droplet positioned within an electrical representation and accepting the applied finger as a living finger when the size of the like-positioned water droplet is larger than the size of the first water droplet, as disclosed in the limitations of claim 8.

19. As to claim 9, none of the prior art teach or fairly suggest the limitation of “the fingerprint vitality technique configured to cause the system to compare a total **swing ratio** between the plurality of electrical representations”, in combination with the other limitations of the claim. The prior art of Morita, already of record, discloses an image capture device, a spoof detection module and a minutia matching module, wherein the spoof detection module discloses a fingerprint vitality technique (column 10, lines 29-46), but does not teach or fairly suggest the limitation of the fingerprint vitality technique configured to cause the system to compare a total **swing ratio** between the plurality of electrical representations, as disclosed in the limitations of claim 9.

20. As to claim 20, none of the prior art teach or fairly suggest the limitations of “locating water droplets in each of the plurality of electrical representations” and “accepting the applied finger as a living finger when the water droplet size increases over time, as represented in the plurality of electrical representations”, in combination with the other limitations of the claims. The prior art of Morita, already of record, discloses capturing images of an applied finger,

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analyzing relative temporal anomalies and matching minutia when the step of analyzing indicates that the applied finger is a living finger, wherein the step of analysing comprises water droplets analysis (column 10, lines 29-46). Morita does not teach or fairly suggest the limitations locating water droplets in each of the plurality of electrical representations and accepting the applied finger as a living finger when the water droplet size increases over time, as represented in the plurality of electrical representations, as disclosed in the limitations of claim 20.

21. As to claim 21, none of the prior art teach or fairly suggest the limitations of “saving the digitally processed electrical representation as a mask”, in combination with the other limitations of the claims. The prior art of Morita, already on record, discloses capturing images of an applied finger, analyzing relative temporal anomalies and matching minutia when the step of analyzing indicates that the applied finger is a living finger. Morita does not teach or fairly suggest the limitations saving the digitally processed electrical representation as a mask and using the mask in analysis to determine anomalies that are indicative of a living finger, as disclosed in the limitations of claim 21.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled “Comments on Statement of Reasons for Allowance.”

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22. Claims 2, 3, 6, 15, 16 and 19 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

***Conclusion***

**23. THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.


24. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Aaron W. Carter whose telephone number is (571) 272-7445. The examiner can normally be reached on 8am - 4:30 am (Mon. - Fri.).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bhavesh Mehta can be reached on (571) 272-7453. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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